

QUT Digital Repository:
<http://eprints.qut.edu.au/>



This is the author version published as:

Davis, Leigh M. and Ware, Robert S. and McCann, Damhnat and Keogh, Samantha and Watson, Karen (2010) *Factors influencing paediatric nurses' responses to medication administration*. Quality and Safety in Health Care.

© Copyright 2010 the Authors

Note

This manuscript has been uploaded as a complete pdf file. It contains 15 pages (including this one) and includes one figure and one table.

Title

Factors influencing paediatric nurses' responses to medication administration.

Authors

Leigh Davis (School of Nursing, Queensland University of Technology, Brisbane, Australia), Robert S. Ware (School of Population Health, The University of Queensland, Brisbane, Australia; and Queensland Children's Medical Research Institute, Brisbane, Australia), Damhnat McCann (School of Nursing & Midwifery, University of Tasmania, Launceston, Australia), Samantha Keogh (Brisbane Royal Children's Hospital, Brisbane, Australia), Karen Watson (Brisbane Royal Children's Hospital, Brisbane, Australia).

Corresponding Author

Robert S. Ware, School of Population Health, The University of Queensland, Herston Road, Herston, QLD 4006, Australia. Email: R.Ware@uq.edu.au.

Keywords

Medication Errors, Questionnaires, Pediatric Nursing, Factorial Vignettes.

Word Count:

Abstract: 114

Main text: 1388

ABSTRACT

Objective: To evaluate the importance of contextual and policy factors on nurses' judgment about medication administration practice.

Design: A questionnaire survey of responses to a number of factorial vignettes in June 2004. These vignettes considered a combination of seven contextual and policy factors that were thought to influence nurses' judgments relating to medication administration.

Participants: 185 (67% of eligible) clinical paediatric nursing staff returned completed questionnaires.

Setting: A tertiary paediatric hospital in Brisbane, Australia.

Results: Double checking the patient, double checking the drug and checking the legality of the prescription were the three strongest predictors of nurses' actions regarding medication administration.

Conclusions: Policy factors and not contextual factors drive nurses' judgment in response to hypothetical scenarios.

INTRODUCTION

Medication errors are a major cause of morbidity and mortality among hospitalized children.[1, 2] Although errors occur at similar rates to adults, they have three times the potential to cause harm in a paediatric setting.[3] Paediatric patients are especially vulnerable to adverse outcomes from medication error as they have a reduced capacity for communicating if they are experiencing side effects, immature physiological responses, and therefore a limited reserve to withstand a dosing error,[1, 2] and because of the need for weight-based drug dosing which involve multiple calculations and dilution of stock solutions.[4]

Paediatric nurses are at the end-point of the medication administration process and to date there has been a lack of published data linking causal factors to nurses' clinical judgments and decision-making. It has been suggested that one important cause of many reported medication errors could be explained by policy non-adherence or deviation from hospital policy.[5] Studies have reported routine deviations from, or violation of policy guidelines by nursing staff and anaesthetists.[6] The aim of this study is to investigate how contextual and policy factors influence paediatric nurses' judgments relating to medication administration.

METHODS

Design

Paediatric nurses completed a questionnaire survey consisting of six vignettes concerning medication administration issues. Vignettes in the questionnaire

were developed to vary according to four contextual and three policy factors, each of which have two levels (in brackets) that were manipulated within each vignette to examine differences in decision-making. A previous qualitative phase of interviews and focus groups, involving 32 paediatric nurses, informed the development and planning of the questionnaire. The qualitative phase identified four key contextual factors and three key policy factors thought to influence medication administration practice. The identified contextual factors were the drugs potential harm (harmful/not harmful), the nurse's familiarity with the patient (familiar/not familiar), whether the nurse was working with an experienced colleague (yes/no), and the workload (heavy/light). Although by their nature these terms are subjective, we avoided confusion by using extreme examples. For example when considering whether a drug was potentially harmful we used commonly prescribed drugs that are perceived to be either not-at-all harmful such as paracetamol, or very harmful, such as morphine. The three medication policy factors identified are from the hospital's prescribed medication policy, which all nurses working within the hospital are aware of. They were whether the drug was double checked (yes/no), whether the patient was double checked (yes/no), and whether the prescription was legal (legal order/not legal order). An example of a vignette is displayed in Figure 1.

Figure 1: Example of a case vignette used in the questionnaire.

Adam is a registered nurse working a day shift on his usual ward in a paediatric hospital. The ward is quiet and Adam is only caring for one patient. Beth, a graduate nurse who has been on the ward for 6 weeks, asks him to check IV acyclovir for a 10 yr old girl that Adam often looks after. Adam watches while Beth prepares the medication. Although Adam thinks the medication order is poorly written, Beth thinks she knows what it says. Beth thanks Adam. Adam says “that's for Jessica in Bed 4” and goes back to his own work.

For each vignette nurses were asked how strongly they agreed that: the nurse's actions demonstrated good practice; the medication was safely delivered; the medication was administered according to policy; the average nurse would behave similarly; and their own actions would mirror the actions portrayed in the vignette. Participants rated their level of agreement with each aspect according to a five-point Likert scale (1=strongly disagree to 5=strongly agree). Each nurse was presented with six different vignettes to appraise. Such vignettes are known as factorial vignettes, designed to assess how much influence a specific situational factor has in a given aspect of the contextual or policy factor being investigated.

After the vignettes were developed, a selection of them was assessed for content and face validity by a panel of ten expert and experienced nurses, none of whom were involved in the questionnaire development. Some of the vignettes were modified according to their comments; the questionnaire was

then piloted within a group of eight paediatrics nurses outside of the sample group who were involved in administering medication. The vignettes were thought to be realistic and representative of a real-life situation.

Study participants

The study took place in a tertiary paediatric hospital in Brisbane, Australia, between May and July 2004. All clinical paediatric nursing staff (n=278) working in the emergency department, intensive care, medical and surgical wards were invited to participate. Staff working in the operating theatres were excluded due to the selective nature of medication administration in this area.

Data collection

Covering letters, questionnaires and return-address envelopes were distributed to nursing staff by internal mail. The covering letter explained the purpose, rationale and potential benefits of the proposed study and provided a guarantee of confidentiality and anonymity. Approval for the study was obtained from the hospital's research and ethics committees as long as no data that could identify an individual was collected.

.

Statistical analysis

A hierarchical model was fitted to each of the five questions relating to nurses' judgment about medication administration practice, where the nurses' responses were assumed to be random and the seven contextual and policy factors fixed for each vignette. The clustering on each nurse (because they responded to multiple vignettes) was taken into account. The model estimated

the difference in agreement with the statements when the contextual or policy factor was present compared to when it was absent. Thus, the difference measures how much importance nurses placed on the contextual and policy dimensions across the five questions medication practice. By convention, differences were considered to be of practical value when the absolute difference is greater than 0.4, and highly significant when greater than 1. A positive difference denoted agreement with the statement when the factor is present and a negative difference denoted disagreement. All statistical analyses were performed using Stata version 9.1 (StataCorp College Station, TX, USA).

RESULTS

A total of 185 of 278 (67%) nurses completed their surveys. 54% of the participants had greater than 6 years experience in paediatric nursing, 46% were aged 35 years or older and 74% were level NO1. A level NO1 nursing officer is a registered nurse with direct patient care responsibilities, but without additional leadership or educational responsibilities.

The relationship between the five questions regarding medication administration and the seven contextual and policy factors are summarized in Table 1. Nurses perceived significant positive effects on all five aspects of medication culture practice on each of the three policy factors: if the drug was double checked, if the patient was double checked and if it was a legal prescription. For example, average score was 0.75 higher (95%CI: 0.63, 0.89) when the drug was double checked, than when it was not. In terms of

double checking the patient, respondents recorded a highly significant difference when the aspects considered were whether the medication was administered according to policy, and whether the average nurse would behave similarly.

Table 1. Association of the seven contextual and policy factors with each dimension of nursing judgment. Results are presented as mean difference (95%CI) of scores when the contextual factor was present compared to when it was absent. A positive difference denotes agreement with the statement when the factor is present

		Five aspects of medication culture practice				
		Nurses actions demonstrated good practice	Medication safely delivered	Medication administered according to policy	Average nurse would behave similarly	Own actions would mirror actions portrayed in vignette
Seven contextual and policy dimensions	Drugs Potential Harm	0.01 (-0.13,0.15)	0.08 (-0.07,0.22)	0.01 (-0.14,0.16)	0.00 (-0.15,0.15)	0.00 (-0.14,0.14)
	Familiarity with patient	-0.04 (-0.18,0.10)	-0.23 (-0.37,-0.08)	-0.11 (-0.26,0.03)	-0.18 (-0.33,-0.03)	-0.05 (-0.19,0.08)
	Working with an experienced colleague	-0.16 (-0.29,-0.02)	-0.22 (-0.37,-0.08)	-0.18 (-0.32,-0.03)	-0.28 (-0.43,-0.13)	-0.04 (-0.18,0.10)
	Workload	-0.02 (-0.16,0.12)	0.08 (-0.07,0.22)	-0.04 (-0.18,0.11)	-0.02 (-0.17,0.13)	-0.05 (-0.19,0.09)
	Double checking drug	0.76 (0.63,0.89)	0.35 (0.21,0.49)	0.59 (0.45,0.73)	0.59 (0.45,0.74)	0.74 (0.61,0.88)
	Double checking patient	0.94 (0.82,1.07)	0.78 (0.64,0.91)	1.01 (0.88,1.14)	1.03 (0.89, 1.17)	0.82 (0.69, 0.95)
	Legal prescription	0.77 (0.64, 0.90)	0.36 (0.22, 0.50)	0.77 (0.63, 0.91)	0.55 (0.40, 0.70)	0.86 (0.73,0.99)

DISCUSSION

This study identified policy factors, rather than contextual factors, influence nurses' judgments in response to hypothetical scenarios concerning medication administration. Double checking the patient is the strongest predictor of nurses' actions regarding medication administration. Paediatric nurses appear to recognize and agree upon the fundamental safety aspects built into the current medication policy and that these safeguards should direct decision-making when administering drugs to hospitalized children.

Unfortunately the sensitivity of the topic meant that we were unable to gather enough data about individual respondents to examine whether there were differences in responses from nurses working in different areas.

Vignettes have historically been used in social science research as a tool to gather information about how clinical judgments are made about patient care situations and the factors that influence those judgments. Vignettes offer a less threatening way to explore sensitive subjects and their specificity allows contextual influences on judgments to be examined.[8, 9]. We used factorial vignettes in an attempt to capture complex real life situations, and the conditions of individual choice and judgment, while being able to clearly identify the separate influence that each specific contextual or policy factor has on a nurse's judgment in each aspect being investigated.

Other studies have consistently reported factors occurring in the real-world context which contribute to the potential for error such as stress, fatigue, communication errors, knowledge and skill deficits,[10, 11] busy workloads,

interruptions and distractions occurring during preparation and administration of medications,[11, 12] lack of perceived risk, poor role models and the cultural context which permits unsafe medication practice.[6]

Whether evaluations of hypothetical situations relate to judgments in real life remains an issue.[8] The questionnaire was carefully constructed to be realistic, with high reliability and internal validity, but it is important to note that any self-report instrument can measure only decision making and may not predict actual behaviour in similar situations. Our group is conducting further research to determine how closely these findings gleaned from realistic, but hypothetical, vignettes corresponds with real-world practice.

COMPETING INTERESTS

No author has any affiliation or financial involvement in any organization or entity with a direct financial interest in the subject matter or materials discussed in the article.

EXCLUSIVE LICENCE

The Corresponding Author has the right to grant on behalf of all authors and does grant on behalf of all authors, an exclusive licence (or non-exclusive for government employees) on a worldwide basis to the BMJ Publishing Group Ltd and its Licensees to permit this article (if accepted) to be published in Quality and Safety in Health Care and any other BMJ PGL products to exploit all subsidiary rights, as set out in our licence (<http://qhc.bmj.com/iforalicence.pdf>).

REFERENCES

- 1 Kaushal R, Bates DW, Landrigan C, *et al.* Medication errors and adverse drug events in paediatric inpatients. *JAMA* 2001;**285**:2114-20.
- 2 Koren G. Trends of medication errors in hospitalized children. *J Clin Pharmacol* 2002;**42**:707-10.
- 3 Fortescue EB, Kaushal R, Landrigan CP, *et al.* Prioritizing strategies for preventing medication errors and adverse drug events in paediatric inpatients. *Pediatrics* 2003;**111**:722-9.
- 4 Kozer E, Berkovitch M, Koren G. Medication errors in children. *Pediatr Clin North Am* 2006;**53**:1155-68.
- 5 Armitage G, Knapman H. Adverse events in drug administration: a literature review. *J Nurs Manag* 2003;**11**:130-40.
- 6 Taxis K, Barber N. Causes of intravenous medication errors: an ethnographic study. *Qual Saf Health Care* 2003;**12**:343-7.
- 7 Davis L, Keogh S, Watson K, *et al.* Dishing the drugs: a qualitative study to explore paediatric nurses' attitudes and practice related to medication administration. *Collegian* 2005;**12**:15-20.

- 8 Ludwick R, Zeller RA. The factorial survey: an experimental method to replicate real world problems. *Nurs Res* 2001;**50**:129-33.
- 9 Lauder W. (2002) Factorial survey methods: a valuable but under-utilised research method in nursing research? *Nursing Times Research* 2002;**7**:35-45.
- 10 Leape LL, Bates DW, Cullen DJ, *et al.* Systems analysis of adverse drug events. *JAMA* 1995;**274**:35-43.
- 11 Osborne J, Blais K, Hayes JS. Nurses' perceptions: when is it a medication error? *J Nurs Adm* 1999;**29**:33-8.
- 12 Mayo AM, Duncan D. Nurse perceptions of medication errors: what we need to know for patient safety. *J Nurs Care Qual* 2004;**19**:209-17.